X-ray Spectrometers Based on Arrays of Transition-edge Sensor Microcalorimeters

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X-ray spectrometers based on arrays of low temperature microcalorimeters have recently emerged as tools for beamline and laboratory science [1]. X-ray spectrometers developed at NIST have now been disseminated to three light sources, two particle accelerators, and two laboratory-scale experiments. The energy-dispersive sensor arrays in these spectrometers combine large active areas with spectral resolving powers typically associated with wavelength-dispersive detectors. In this presentation, we describe the performance of existing 240 pixel instruments and ongoing work to develop and read out larger arrays of faster pixels. We also describe recent science results including demonstrations of hard x-ray absorption and emission spectroscopy with few-picosecond time resolution.

[1] J. N. Ullom, D. A. Bennett, *Superconducting Science and Technology* 28 (2015) 084003.